

REMARKS/ARGUMENTS

This is intended as a full and complete response to the Final Office Action dated May 13, 2009, having a shortened statutory period for response set to expire on August 13, 2009. Please reconsider the claims pending in the application for reasons discussed below.

Claims 1-23 and 63 are pending in the application and remain pending following entry of this response.

Provisional Double Patenting

Claims 1-23 and 63 are provisionally rejected under 35 U.S.C. § 101 as claiming the same invention as that of Application No. 10/794,918. Applicants request this rejection be held in abeyance as no claims have yet issued.

Claim Rejections - 35 U.S.C. § 103

Claims 1-3, 5, 7, 14-17, 19-22 and 63 are rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over *Trikkonen et al.* (U.S. Publication 2004/0002364, hereinafter, “*Trikkonen*”) in view of *Ketchum et al.* (U.S. Publication 2003/0108117, hereinafter, “*Ketchum*”).

Applicants respectfully traverse these rejections.

The Examiner bears the initial burden of establishing a *prima facie* case of obviousness. See MPEP § 2141. Establishing a *prima facie* case of obviousness begins with first resolving the factual inquiries of *Graham v. John Deere Co.*, 383 U.S. 1 (1966). The factual inquiries are as follows:

- (A) determining the scope and content of the prior art;
- (B) ascertaining the differences between the claimed invention and the prior art;
- (C) resolving the level of ordinary skill in the art; and
- (D) considering any objective indicia of nonobviousness.

Once the *Graham* factual inquiries are resolved, the Examiner must determine whether the claimed invention would have been obvious to one of ordinary skill in the art.

Respectfully, Applicants submit that the Examiner has not properly characterized the teachings of the references and, as a result, has failed to ascertain differences between the claimed invention and the prior art.

For example, in rejecting claim 1, the Examiner states that *Trikkonen* teaches performing spatial processing on at least one of the pilot and data symbols for each subband, with the spatial processing randomizing a plurality of effective single-input single-output (SISO) channels observed across the plurality of subbands. However, Applicants respectfully submit that *Trikkonen* is silent as to randomizing effective SISO channels. In fact, *Trikkonen* fails to mention effective SISO channels, or SISO at all.

While the Examiner concedes that *Trikkonen* fails to teach that "spatial processing is performed for each subband," the Examiner relies on paragraph [0011] *Ketchum* as teaching this element:

[0011] Aspects of the invention provide techniques for processing a data transmission at the transmitter and receiver of a MIMO system such that high performance (i.e., high throughput) is achieved without the need to individually code/modulate for different frequency bins. In an aspect, a time-domain implementation is provided herein which uses frequency-domain singular value decomposition and "water-pouring" results to derive pulse-shaping and beam-steering solutions at the transmitter and receiver. The singular value decomposition is performed at the transmitter to determine the eigen-modes (i.e., the spatial subchannels) of the MIMO channel and to derive a first set of steering vectors that are used to "precondition" modulation symbols. The singular value decomposition is also performed at the receiver to derive a second set of steering vectors that are used to precondition the received signals such that orthogonal symbol streams are recovered at the receiver, which can simplify the receiver processing. Water-pouring analysis is used to more optimally allocate the total available transmit power for the MIMO system to the eigen-modes of the MIMO channel. The allocated transmit power may then determine the data rate and the coding and modulation scheme to be used for each eigen-mode.

It should be noted that claim 1 recites that spatial processing is performed “on at least one of the pilot and data symbols for each subband with at least one steering vector selected for the subband.” However, the above-cited paragraph does not teach selecting a steering vector for each subband. Further, there is no teaching of “randomizing effective SISO channels.” In fact, the only reference to SISO is in paragraph [0178]:

[0178] The sequence metrics, $K_{sub.m(i)}$, are identical in form to sequence metrics associated with the MLSE for SISO channels with inter-symbol interference. Therefore, MLSE Viterbi equalization as is known in the art can be applied to the equalization of the individual received symbol streams, as follows.

This paragraph does not teach randomizing effective SISO channels.

For at least the reasons given above, Applicants submit that claim 1 is allowable over the art of record, and respectfully request that the rejection of claim 1 be withdrawn.

Each of independent claims 14, 19 and 63 includes features substantially similar to those of claim 1, and are therefore also allowable over the art of record for at least the reasons given above.

Claim 4 is rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over *Trikkonen* in view of *Ketchum*, and further in view of *Honig* (U.S. Patent No. 6,956,897). Claims 6, 10 and 12 are rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over *Trikkonen* in view of *Ketchum*, and further in view of *Walton et al.* (U.S. Publication 2003/0235147, hereinafter, “*Walton*”). Claim 8 is rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over *Trikkonen* in view of *Ketchum*, and further in view of *Jasper et al.* (U.S. Patent No. 6,441,786, hereinafter, “*Jasper*”). Claim 9 is rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over *Trikkonen* in view of *Ketchum*, and further in view of *Shattil* (U.S. Publication 2004/0086027). Claim 11 is rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over *Trikkonen* in view of *Ketchum* and *Walton*, and further in view of *Hudson et al.* (U.S. Patent No. 6,477,161, hereinafter, “*Hudson*”). Claims 13, 18 and 23 are rejected under 35 U.S.C. § 103(a) as being allegedly unpatentable over *Trikkonen* in view of *Ketchum*, and further in view of *Lewis* (U.S. Publication 2004/0102157).

Each of these claims ultimately depends from one of independent claims 1, 14 or 19. Further, none of the above cited references overcomes the shortcomings in the teachings of *Trikkonen* and *Ketchum* discussed above.

Accordingly, Applicants submit these claims are also allowable over the art of record and respectfully request withdrawal of this rejection.

CONCLUSION

Therefore, for at least the reasons presented above with respect to all of the pending claims subsequent to entry of this response, Applicants assert that all claims are patentably distinct from all of the art of record. All objections and rejections having been addressed, it is respectfully submitted that this application is in condition for allowance and a Notice to that effect is earnestly solicited. If any points remain in issue that the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

Charge Statement: For this application, the Commissioner is hereby authorized to charge any required fees or credit any overpayment to Deposit Account 17-0026.

Respectfully submitted,
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